SÜTRON

User Manual

HMI Linkbox HL01 DP/MPI

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Valid for:	HL01 DP/MPI

SÜTRON ELECTRONIC GMBH

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1 Important Notes

1.1 Symbols

The symbols in this manual are used to draw your attention on notes and dangers.

1.1.1 General Symbols

Danger
This symbol is used to refer to instructions which, if ignored or not carefully followed could result in personal injury.

Note
This symbol indicates application tips or supplementary notes.

Reference to source of information
This symbol refers to detailed sources of information on the current topic.

1.1.2 Specific Symbols

The following symbols indicate specific dangers which could result in damage to equipment or personal injury or even up to the death of the operator.

Danger - Electric Shock

Danger - Corrosive

Danger - Toxic

Danger - Explosive

Danger - Fire

Danger - Infrared Light

Danger - Electrostatic Charge

1.2 Safety Notes

- Read this manual carefully before using the operating device. Keep this manual in a place where it is always accessible to all users.
- Proper transportation, handling and storage, placement and installation of this product are prerequisites for its subsequent flawless and safe operation.
- This user manual contains the most important information for the safe operation of the device.
- The user manual, in particular the safety notes, must be observed by all personnel working with the device.
- Observe the accident prevention rules and regulations that apply to the operating site.
- Installation and operation must only be carried out by qualified and trained personnel.

1.3 Intended Use

- The device is designed for use in the industry.
- The device is state-of-the art and has been built to the latest standard safety requirements. However, dangerous situations or damage to the machine itself or other property can arise from the use of this device.
- The device fulfills the requirements of the EMC directives and harmonized European standards. Any modifications to the system can influence the EMC behavior.

1.4 Target Group

All configuration, programming, installation, commissioning, operating and maintenance work in connection with the automation system must be performed by trained personnel only (e.g. qualified electricians, electrical engineers, etc.).

The configuration and programming personnel must be familiar with the safety concepts of automation technology.

The operating personnel must have been trained in handling the controller and be familiar with the operating instructions.

The installation, commissioning and maintenance personnel must have an education which entitles them to work on automation systems.

2 Introduction

The HMI linkbox HL01 DP/MPI is designed for use in particular when you have to connect or disconnect hand-held operating devices during operation to an active PROFIBUS-DP or MPI bus. The HMI linkbox HL01 DP/MPI prevents any disruption to an existing emergency stop circuit and to bus communication.

The connection is set up using an internal repeater with direction reversal.

Terminating resistors fitted on the device enable it to terminate the bus. You can switch on these terminating resistors with DIP switches inside the HL01 DP/MPI, if required.

The hand-held operating device is connected using a 19-pin circular connector with a bayonet lock. The maximum length of the cable connecting the hand-held operating device is 10 meters (32.808 ft) with a baud rate of 12 MBit/s.

3 Installation and Commissioning

3.1 Unpacking the Device

Unpack all parts carefully and check the contents for any visible damage in transit. Also check whether the shipment matches the specifications on your delivery note.

If you notice damages in transit or discrepancies, please contact our sales department immediately.

3.2 Identification

The device can be identified by means of the nameplate.

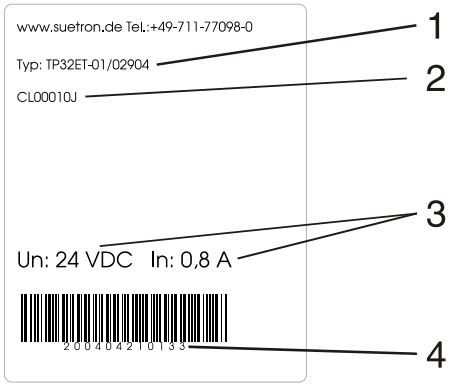

Figure 3-1 Nameplate (example)

1 Order number
2 Firmware revision level (when device is initially supplied)
3 Voltage and current specification
4 Serial number

3.3 Mounting the Device

To ensure the required degree of protection, you must check that all empty PG glands are filled with sealing plugs and all PG glands containing cables are screwed tight. You must also ensure that all of the screws used to secure the cover have been tightened evenly.

If you wish to ensure the required degree of protection, do not use screws with a countersunk head to mount the device!

3.3.1 Front View

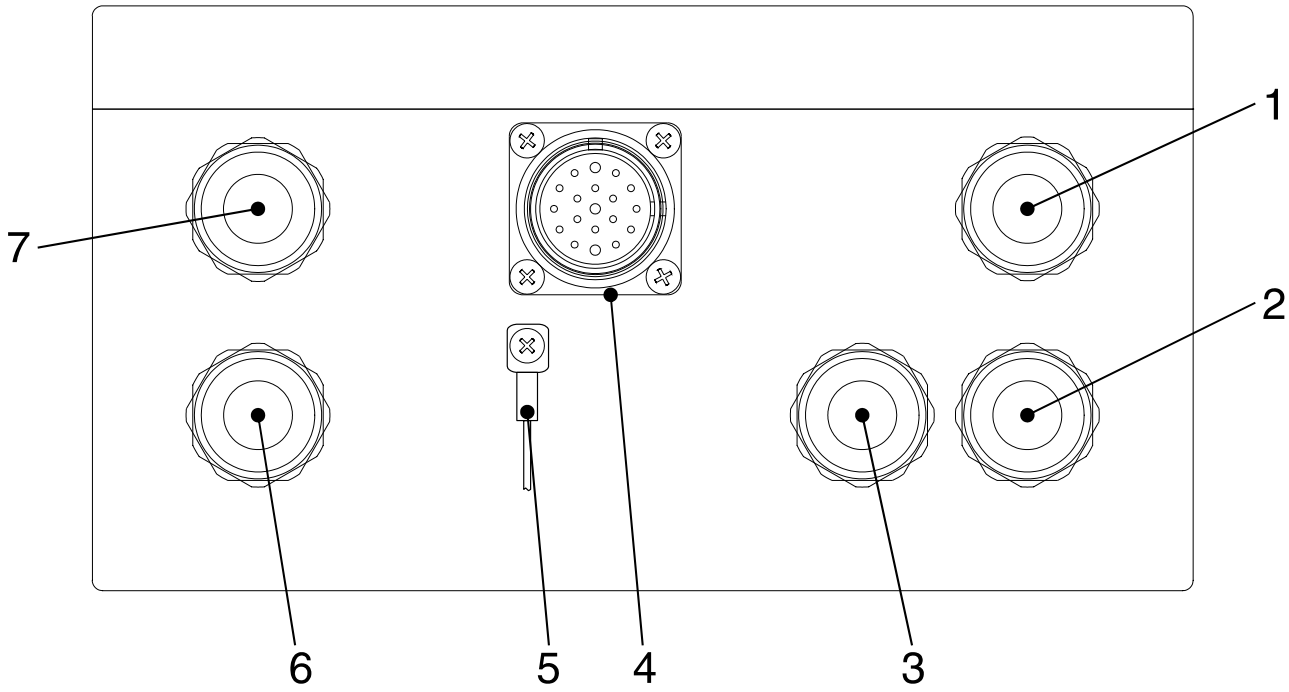

Figure 3-2 Front view with PG glands

1 Gland M16 x 1.5 (emergency stop and outgoing supply voltage)
2 Gland M16 x 1.5 (emergency stop and incoming supply voltage)
3 Gland M16 x 1.5 (with blind plug for optional connection of command devices)
4 Device connector
5 Retaining device for dust cap of device connector
6 Screwed cable gland M16 x 1.5 (PROFIBUS-DP IN)
7 Screwed cable gland M16 x 1.5 (PROFIBUS-DP OUT)

3.3.2 Mounting view

Mount the device on a level surface, while the cover is unscrewed and removed.

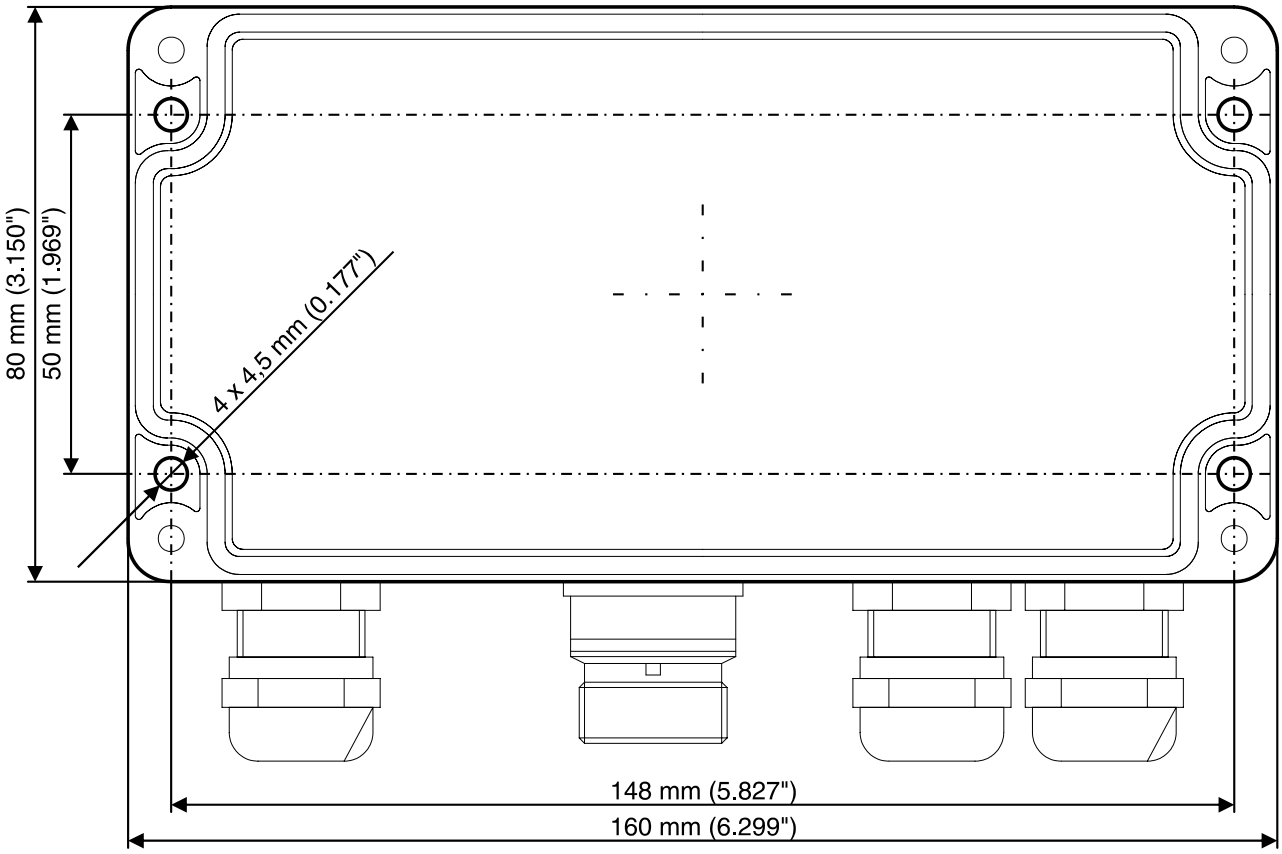

Figure 3-3 Mounting view

3.4 Connecting the Device

3.4.1 Connection Diagram

The following connection diagram illustrates how the linkbox is connected with all of the components that may be used.

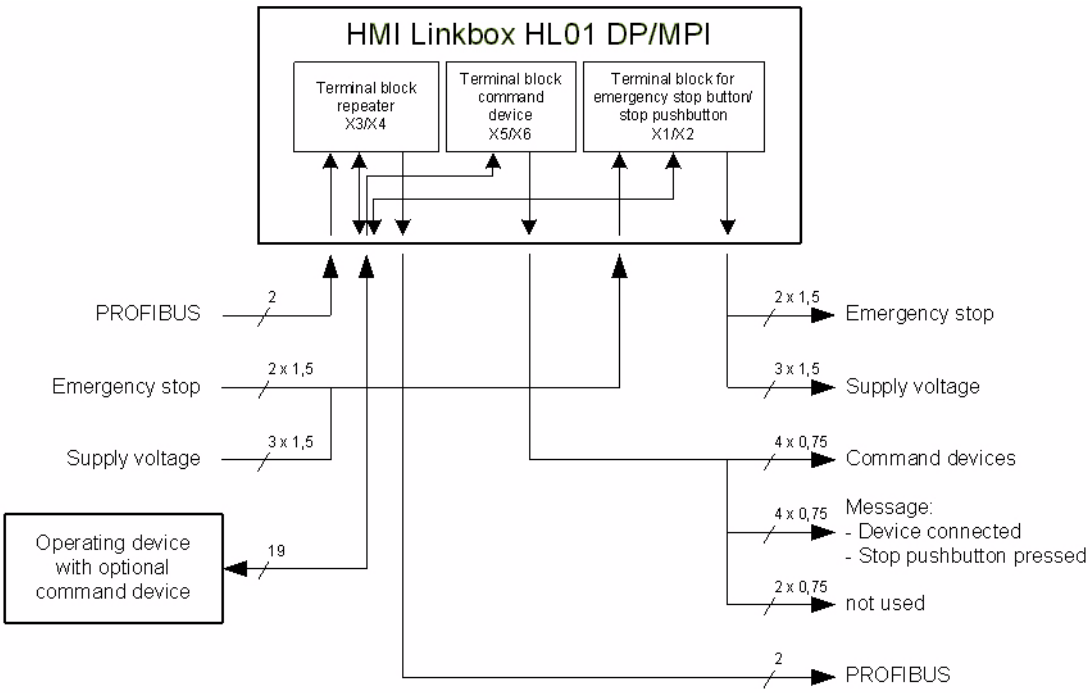

Figure 3-4 Connection diagram

RISK OF SERIOUS INJURY OR DEATH!
The linkbox with order number 81214.300 must NOT be used together with an operating device with an emergency stop button and with a stop pushbutton!
In this linkbox, the emergency stop circuit is only looped through!

The connecting cable for the TesiMod hand-held operating device must NOT exceed 10 m (32.808 ft) in length if a baud rate of 12 MBit/s is used!

3.4.2 24 V Supply Voltage

The supply voltage is supplied through terminal block X1.

The device is equipped with another terminal block (X2) which you use to loop-through the supply voltage to further components.

The maximum continuous current allowed to flow from terminal block X1 to X2 is 2 A. To prevent overload, an external fuse protection must be installed (e.g. fusible cut-out).

The device has reverse polarity protection. In case of wrong polarity, the device will not operate.

This is a protection class I device. For safe operation, safety extra-low voltage (SELV) in accordance with DIN EN 61131 must be used for the supply voltage.

Connector in the operating device: 3 pin Phoenix COMBICON MSTBV 2,5/3-GF connector

Table 3-1 Pin assignment - supply voltage

Pin	Designation	Function
1	⏚	Low-Noise Ground
2	0 V	Supply Voltage 0 V
3	24 VDC	Supply Voltage 24 VDC

A suitable female connector strip of the type Phoenix COMBICON MSTB 2,5/3-STF is supplied.

A cable with finely stranded conductors with a minimum cross-section of 0.75 mm² and a maximum cross-section of 2.5 mm² must be used for the voltage supply.

Hazardous voltages can exist inside electrical installations that can pose a danger to humans. Coming in contact with live parts **may result in electric shock!**

Do the following to connect the device to the supply voltage:

1. Strip approx. 30 mm (1.181") off the outer sheath of the cable and approx. 5 mm (0.197") off the wires.

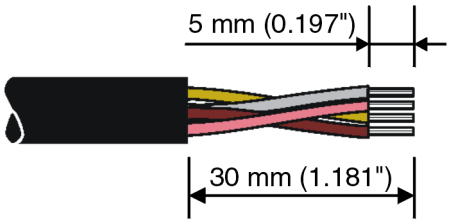

Figure 3-5 Preparing the cable

2. Attach wire end ferrules to the wires.
3. Insert the cable through the gland into the device.
4. Connect the wires to the terminal block.

If shielded connecting cables are used in the supply voltage area, the shield should be connected to pin 1.

5. Secure the cable in place with a screwed cable gland land to prevent it from slipping out.

A separate conductor must always be provided for the protective grounding at the terminal block. The conductor must have a minimum cross-section of 1.5 mm² and must be kept as short as possible.

4 Interfaces of the Device

4.1 Round Connector

RISK OF SERIOUS INJURY OR DEATH!
Sütron electronic GmbH assumes no liability if customers undertake to assemble the male connector of the operating device themselves!
If the pins are not properly assembled, this may result in failure of the bus system and/or emergency stop circuit!

A 19-pin circular connector with a bayonet lock is used to connect an operating device. To prevent a break in the emergency stop circuit, the male connector of the hand-held operating device being connected must be equipped with leading contacts for the emergency stop circuit!

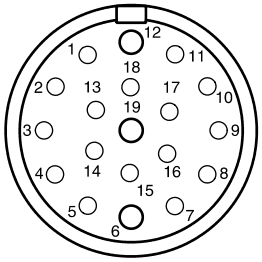

Figure 4-1 Looking onto pluggable side of female connector on HL01 DP/MPI

The pin assignment for the 19-pin connector is as follows:

Table 4-1 Pin assignment for HL01 DP/MPI

Pin	Designation	Function	Terminal Block
1	0 V HT	Supply voltage for operating device 24 V/2 A at maximum	
2	24 V HT	Supply voltage for operating device 24 V/2 A at maximum	
3		Jumper in device connector to pin 4	
4		Jumper in device connector to pin 3	
5		Jumper in device connector to pin 15	
6		Optionally used by command devices 24 V/500 mA at maximum	X5.1
7	Ö	Emergency stop channel 2 (break contact) Contact must be leading!	
8	Ö	Emergency stop channel 2 (break contact) Contact must be leading!	
9	Ö	Emergency stop channel 1 (break contact) Contact must be leading!	

Table 4-1 Pin assignment for HL01 DP/MPI

Pin	Designation	Function	Terminal Block
10		Optionally used by command devices 24 V/500 mA at maximum	X6.5
11	CNTR	Direction reversal for repeater	
12	PE	Low-noise ground for operating device	
13	RxD/TxD-N	PROFIBUS DP/MPI RxD/TxD-N (green)	
14	RxD/TxD-P	PROFIBUS DP/MPI RxD/TxD-P (red)	
15		Jumper in device connector to pin 5	
16	Ö	Emergency stop channel 1 (break contact) Contact must be leading!	
17		Optionally used by command devices 24 V/500 mA at maximum	X6.4
18	DGND	Reference potential for repeater	
19		Optionally used by command devices 24 V/500 mA at maximum	X5.2

4.2 Terminal Blocks

The arrangement of the terminal blocks in the linkbox is displayed on a label inside the cover.

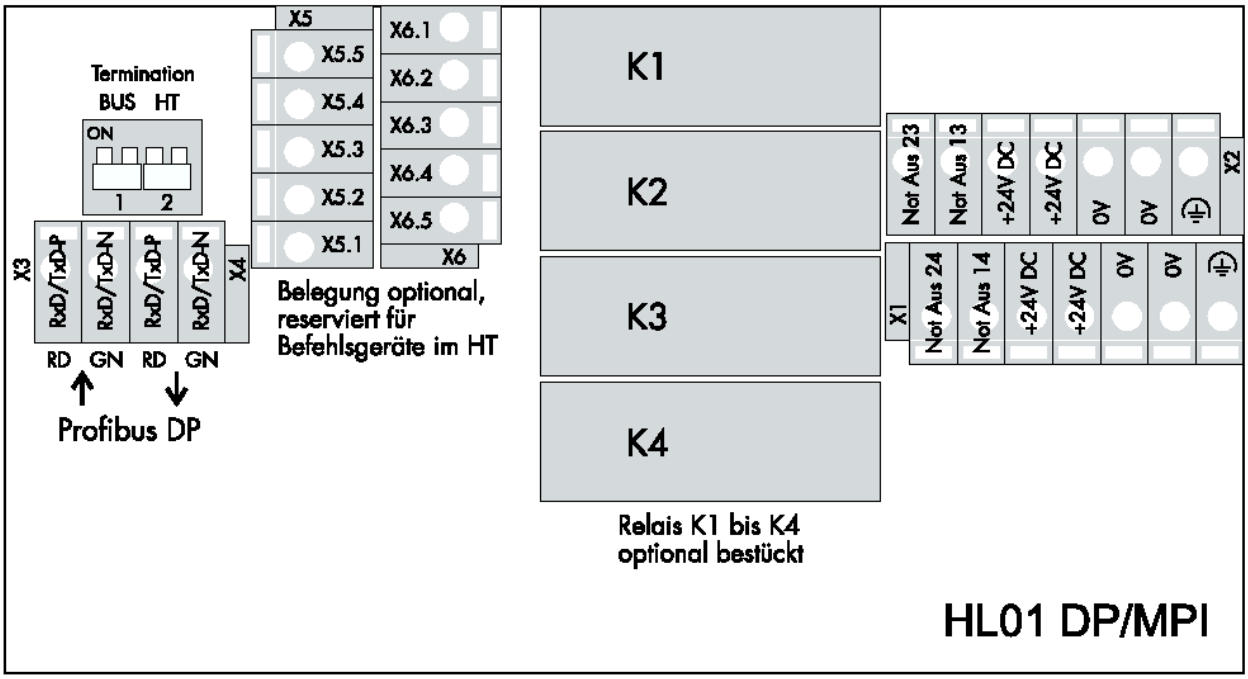

Figure 4-2 Arrangement of the terminal blocks

4.2.1 X1 to X4

Table 4-2 Terminal block X1

Connection terminal in HMI linkbox	Signal
X1.1	Low-noise ground
X1.2	Supply voltage 0 V DC
X1.3	Supply voltage 0 V DC
X1.4	Supply voltage +24 V DC
X1.5	Supply voltage +24 V DC
X1.6	Emergency stop channel 1 (break contact)
X1.7	Emergency stop channel 2 (break contact)

Table 4-3 Terminal block X2

Connection terminal in HMI linkbox	Signal
X2.1	Emergency stop channel 2 (break contact)
X2.2	Emergency stop channel 1 (break contact)
X2.3	Supply voltage +24 V DC
X2.4	Supply voltage +24 V DC
X2.5	Supply voltage 0 V DC
X2.6	Supply voltage 0 V DC
X2.7	Low-noise ground

Table 4-4 Terminal block X3

Connection terminal in HMI linkbox	Signal
X3.1	PROFIBUS/MPI RxD/TxD-P red (incoming)
X3.2	PROFIBUS/MPI RxD/TxD-N green (outgoing)

Table 4-5 Terminal block X4

Connection terminal in HMI linkbox	Signal
X4.1	PROFIBUS/MPI RxD/TxD-P red (outgoing)
X4.2	PROFIBUS/MPI RxD/TxD-N green (outgoing)

4.2.2 X5 to X6 for operating device with consent switch

Table 4-6 Terminal block X5

Connection terminal in HMI linkbox	Signal
X5.1	Consent switch left 1 (make contact)
X5.2	Consent switch right 2 (make contact)
X5.3	Not connected
X5.4	Message "Operating device connected" (make contact)
X5.5	Message "Stop button pressed" (make contact)

Table 4-7 Terminal block X6

Connection terminal in HMI linkbox	Signal
X6.1	Message "Stop button pressed" (make contact)
X6.2	Message "Operating device connected" (make contact)
X6.3	Not connected
X6.4	Consent switch left 2 (make contact)
X6.5	Consent switch right 1 (make contact)

4.2.3 X5 to X6 for operating device without consent switch

Table 4-8 Terminal block X5

Connection terminal in HMI linkbox	Signal
X5.1	Not connected
X5.2	Not connected
X5.3	Not connected
X5.4	Message "Operating device connected" (make contact)
X5.5	Message "Stop button pressed" (make contact)

Table 4-9 Terminal block X6

Connection terminal in HMI linkbox	Signal
X6.1	Message "Stop button pressed" (make contact)
X6.2	Message "Operating device connected" (make contact)

Table 4-9 Terminal block X6

Connection terminal in HMI linkbox	Signal
X6.3	Not connected
X6.4	Not connected
X6.5	Not connected

4.3 PROFIBUS DP / MPI

The bus is looped though in the linkbox and also connected to the operating device by means of a repeater with direction reversal.

The operating device is connected to the repeater as a segment.

The connecting cable for the TesiMod hand-held operating device must NOT exceed 10 m (32.808 ft) in length if a baud rate of 12 MBit/s is used!

4.3.1 Termination

The bus line is terminated in the linkbox.
With a point-to-point connection, you must always activate the termination. With a multi-point connection, you only need to activate the termination at the cable end. With a spurline, you must always deactivate the termination.

Termination of the segment cable must always be activated in the linkbox and in the operating device.

The switch positions for ON or OFF are printed onto the termination switch. Only the specified switch positions are allowed.

Table 4-10 Termination switch

S1	S2	S3	S4	Function
Bus		HT		
I	I	I	I	Bus termination is switched ON
–	–	I	I	Bus termination is switched OFF

Legend for table:

I = Switch ON

- = Switch OFF

5 Maintenance and Servicing

5.1 General

The HMI Linkbox is maintenance-free.

You should use a damp cloth to remove any dirt from the device.

6 Technical Data

Electrical Data	
Supply Voltage	24 V DC (SELV in Accordance with DIN EN 61131)
Residual Ripple	20 % Maximum
Minimum Voltage	19.2 V
Maximum Voltage	28.8 V
Power Consumption	0.2 A
Connected Load	5 W
Fuse	Semiconductor Fuse, Self-resetting
Protection Against Polarity Reversal	Integrated

Connection System
Circular Connector with Bayonet Lock 19 Pin
Spring-Cage Connectors FFKDS/V1-5,08

Environmental Conditions	
Temperature During Operation	- 25 °C to + 70 °C (- 13 °F to 158 °F)
Temperature During Storage, Transport	- 25 °C to + 70 °C (- 16 °F to 158 °F)
Relative Air Humidity for Operation and Storage	10% to 95%, Non-Condensing
Application Area	Degree of Pollution 1, Overvoltage Category II

Standards and Guidelines	
Interference Immunity	EN 61000-4-2 EN 61000-4-3 EN 61000-4-4 EN 61000-4-5 EN 61000-4-6 EN 61000-6-2 EN 61131 Part 2
Emitted Interference	EN 55011 Class A EN 55022 Class A EN 61000-6-3 Tab. A1 EN 61000-6-4
Equipment Requirements	EN 61131
Storage and Transportation	EN 61131 Part 2
Power Supply	EN 61131 Part 2
Electromagnetic Compatibility	89/336/EWG (Including all Applicable Amendments)
Degree of Protection	EN 60529
Impact Load, Shocks	EN 60068 Part 2-27

Standards and Guidelines (Cont.)	
Sinusoidal Vibrations	EN 60068 Part 2-6
Corrosion Protection	EN 60950
Climate	DIN EN 60068-2-1 DIN EN 60068-2-2 DIN EN 60068-2-14 DIN EN 60068-2-30

This is a class A device. This device may cause radio interference in residential areas. In this case, the user may be required to introduce appropriate countermeasures, and to bear the cost of same.

Enclosure and Front Panel	
Enclosure	Polycarbonate 80 mm x 160 mm x 85 mm (H x W x D) - (3.150" x 6.299" x 3.346")
Degree of Protection	IP65
Total Weight	Approx. 650 g

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